

Holotypoid echinoids from Cenomanian and Turonian strata in the Mons Basin (Belgium). 1. *Discoides*

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Abstract

Holotypoid specimens belonging to the genus *Discoides*, from the Cenomanian Tourtia-deposits of Belgium are systematically revised. SMISER's (1935) identification of the species concerned proves to be erroneous.

Key-words: Echinoidea - Cretaceous - Belgium.

Résumé

Des spécimens d'holotypoides appartenant au genre *Discoides* et provenant du Tourtia cénoomanien de Belgique, sont révisés au point de vue systématique. L'identification spécifique des spécimens concernés, effectuée par SMISER (1935), est erronée.

Mots-clefs: Echinoidea - Crétacé - Belgique.

Echinoids belonging to the order Holotypoida are common in strata of mid-Cretaceous age. A fair number of specimens have been collected in the Tourtia deposits of the Mons Basin in Belgium. Most of them belong to the genus *Conulus*, while specimens of *Discoides* and a few other genera are considerably less numerous. Fossil specimens, which have been collected for the larger part during the second half of the 19th century, now belong to the collections of the Royal Belgian Institute of Natural Sciences. They have not been subjected to close scrutiny for almost fifty years. I therefore undertook a systematic revision of these interesting fossils, which I intend to publish in three short papers.

D'ARCHIAC (1846) was the first to draw attention to the presence of Holotypoid echinoids in the Cenomanian of Belgium. He mentioned only a single species:

Galerites subsphaeroidalis, nov. sp.

Subsequent 19th century-authors extended the list to three species.

CORNET & BRIART (1866):

Discoidea subuculus, Agass.
Galerites subsphaeroidalis, d'Arch.
Pyrina Desmoulinsii, d'Arch.

DEWALQUE (1868):

Discoidea (Galerites) subuculus, Goldf.

Galerites subsphaeroidalis, d'Arch.
Pyrina Desmoulinsi, d'Arch.

COTTEAU (1874):

Discoidea subuculus, Klein, 1735
Echinoconus Rhotomagensis, d'Orbigny, 1856
Pyrina Des Moulinsi, d'Archiac, 1847

MOURLON (1881):

Discoidea (Galerites) subuculus, Goldf.
Galerites subsphaeroidalis, d'Arch.
Pyrina Desmoulinsi, d'Arch.

SMISER (1935) distinguished no less than six species of holotypoids:

Discoides minimus AGASSIZ
Conulus nucula A. GRAS (*Galerites*)
Conulus subrotundus MANTELL
Conulus subsphaeroidalis D'ARCHIAC (*Galerites*)
Conulus laevis AGASSIZ (*Galerites*)
Pseudopyrina desmoulinsi D'ARCHIAC (*Pyrina*)

Order Holotypoida DUNCAN, 1889
Suborder Holotypina DUNCAN, 1889
Family DISCOIDIDAE LAMBERT, 1900
Genus *Discoides* PARKINSON, 1811

Type species: *Echinites subuculus* LESKE, 1778, by original designation.

Discoides subuculus (LESKE, 1778)
Fig. 1

- *. 1778 *Echinites subuculus*, LESKE, p. 171, pl. 14, fig. L, M, N, O.
- . 1789 *Echinites subuculus*, GMELIN & LINNÉ, p. 3189.
- . 1811 *Discoides subuculus*, PARKINSON, p. 21
- *. 1816 *Galerites rotularis*, LAMARCK, p. 21.
- . 1820 *Galerites rotularis*, DEFRANCE, p. 86.
- . 1824 *Galerites rotularis*, EUDES-DESLONGCHAMPS, p. 433.
- . 1826 *Galerites subuculus*, GOLDFUSS, p. 129, pl. 49, fig. 2.

- .1830 *Echinoneus subuculus*, DE BLAINVILLE, p. 194.
 .1836 *Discoidea rotularis*, AGASSIZ, p. 186.
 .1837 *Galerites subuculus*, DES MOULINS, p. 54.
 .1840 *Discoidea subuculus*, AGASSIZ, p. 7.
 *.1840 *Discoidea minima*, AGASSIZ, p. 7.
 .1841 *Discoidea subuculus*, ROEMER, p. 31.
 .1842 *Discoidea subuculus*, DESOR, p. 54, pl. 7, fig. 5-7.
 .1842 *Discoidea minima*, DESOR, p. 54, pl. 7, fig. 1-4.
 *.1842 *Discoidea pisum*, DESOR, p. 57.
 .1847 *Discoidea subuculus*, AGASSIZ & DESOR, p. 146.
 .1847 *Discoidea minima*, AGASSIZ & DESOR, p. 147.
 .1847 *Discoidea subuculus*, MÜLLER, p. 8.
 .1848 *Discoidea subuculus*, GRAS, p. 44.
 .1848 *Discoidea minima*, BRONN, p. 430.
 .1848 *Discoidea pisum*, BRONN, p. 438.
 .1848 *Discoidea subuculus*, BRONN, p. 430.
 .1849 *Discoidea subuculus*, BRONN, p. 194.
 .1849 *Discoidea minima*, BRONN, p. 194.
 .1849 *Discoidea pisum*, BRONN, p. 194.
 .1850 *Galerites subuculus* var. B, FORBES in DIXON, p. 341.
 1850 *Discoidea subuculus*, D'ORBIGNY, p. 179.
 1850 *Discoidea subuculus*, SORIGNET, p. 39.
 1852 *Discoidea subuculus*, BRONN, p. 190, pl. 29, fig. 19a-c.
 .1854 *Discoidea subuculus*, MORRIS, p. 77.
 .1854 *Discoidea minima*, MORRIS, p. 77.
 .1857 *Discoidea subuculus*, DESOR, p. 176, pl. 24, fig. 1-2.
 .1859 *Discoidea subuculus*, COTTEAU & TRIGER, p. 170, pl. 24, fig. 12.
 .1861 *Discoidea subuculus*, COTTEAU, p. 23-28, pl. 1009, fig. 8-16.
 .1861 *Discoidea minima*, COTTEAU, p. 33-36, pl. 1012, fig. 1-7.
 .1865 *Discoidea subuculus*, COTTEAU, p. 236-240, pl. 68, fig. 9-15.
 (1866) *Discoidea subuculus*, CORNET & BRIART, p. 72, p. 181.
 (1868) *Discoidea (Galerites) subuculus*, DEWALQUE, p. 393.
 .1871 *Discoidea subuculus*, GEINITZ, p. 78, pl. 18, fig. 4.
 .1874 *Discoidea subuculus*, COTTEAU, p. 647.
 .1875 *Galerites subuculus*, QUENSTEDT, p. 414, pl. 76, fig. 36-41.
 1878 *Discoidea subuculus*, COTTEAU, PERON & GAUTHIER, p. 167.
 (1881) *Discoidea (Galerites) subuculus*, MOURLON, p. 89.
 .1885 *Discoidea subuculus*, QUENSTEDT, p. 888, pl. 69, fig. 56L.
 1887 *Discoidea subuculus*, COTTEAU, p. 647-648.
 *.1887 *Discoidea arizensis*, COTTEAU, p. 648-649, pl. 17, fig. 8-12.
 1887 *Discoidea subuculus*, ROUSSEL, p. 626.
 .1887 *Discoidea arizensis*, ROUSSEL, p. 626.
 1911 *Discoidea subuculus*, LAMBERT, p. 75.
 1911 *Discoidea arizensis*, LAMBERT, p. 75.
 .1920 *Discoidea subucula*, HAWKINS, p. 436, pl. 67, fig. 1.
 .1928 *Discoidea minima*, LAMBERT & JEANNET, p. 137 (X81).
 .1928 *Discoidea subuculus*, LAMBERT & JEANNET, p. 155 (P42).
 1931 *Discoidea subuculus*, LAMBERT, p. 158.
 1948 *Discoidea subucula*, MORTENSEN, p. 49, 51, 52, 53, fig. 37a, 38a-d, 43a.
 .1955 *Discoidea subucula*, SZÖRENYI, p. 48-52, pl. 4, fig. 7-8, 10-17, 21.
 1958 *Discoidea subucula*, MACZYNSKA, p. 89, pl. 1, fig. 6-7.
 1958 *Discoidea minima*, MACZYNSKA, p. 93-98, pl. 5, fig. 5-16, pls. 6-9.
 1966 *Discoidea subuculus*, MITROVIC-PETROVIC, tab. 1, tab. 2.
 .1966 *Discoidea subucula*, WAGNER & WYATT DURHAM, p. U44, fig. 330/3.
 .1968 *Discoidea subucula*, HYNDA, p. 205, pl. 42, fig. 1-3.
 1970 *Discoidea subucula*, BLASZKIEWICZ, p. 158.
 1970 *Discoidea minima*, BLASZKIEWICZ, p. 158.
 1976 *Discoidea subuculus*, MITROVIC-PETROVIC, p. 212.
 .1979 *Discoidea* cf. *subucula*, GONGADZE, p. 58-60, pl. 1, fig. 1a-c, 2a-c.
 .1979 *Discoidea* cf. *minima*, GONGADZE, pl. 60-62, pl. 2, fig. 1a-c, 2a-c.
 .1980 *Discoidea subuculus*, FISCHER, p. 268, pl. 133, fig. 8-10.
 .1985 *Discoidea subucula*, SMITH & PAUL, 29-37, fig. 2A-D.
 .1988 *Discoidea subuculus*, SMITH, PAUL, GALE & DONOVAN, p. 96-101, pl. 15, fig. 1-3.
 .1989 *Discoidea subucula*, MALINÓWSKA, p. 306, pl. 92, fig. 3a-c, fig. 6a-c.
- LOCI TYPICI:
E. subuculus: Westphalia, Germany.
G. rotularis: dept. Gers, France.
D. minima: unspecified locality in France.
D. pisum: not specified.
D. arizensis: Pradières, dept. Ariège, France.
- STRATI TYPICI:
E. subuculus: "Kreidemergel" bei Coesfeld.
G. rotularis: not specified.
D. minima: "Craie marneuse".
D. pisum: presumably Cenomanian.
D. arizensis: Cénomanien.
- OCCURRENCES OUTSIDE THE BENELUX-COUNTRIES
France. Cenomanian of Seine-Maritime, Eure, Yonne, Sarthe, Orne, Drôme, Bouches-du-Rhône (COTTEAU, 1861), Aude, Ariège (LAMBERT, 1911).
Germany. Cenomanian of Brunswick (COTTEAU, 1861), Saxony (GEINITZ, 1871), Westphalia (QUENSTEDT, 1875).
Great Britain. Cenomanian of Sussex, Essex, Kent, Dorset, Wiltshire (COTTEAU, 1861).
Switzerland. Cenomanian of Vaud (COTTEAU, 1861).
Poland. Cenomanian of Krakow (MACZYNSKA, 1858).
Hungary. Cenomanian of Bakony (SZÖRENYI, 1955).
Yugoslavia. Cenomanian of Serbia (MITROVIC-PETROVIC, 1966, 1976).
The Ukraine. Cenomanian of Podolia (HYNDA, 1968).
Georgia. Cenomanian (GONGADZE, 1979).
Algeria. Cenomanian of Aumale, Berougniah, Sour Djouab (COTTEAU, PERON & GAUTHIER, 1878).
- STUDIED SPECIMENS
 Sassegny, dept. Nord, France; "Tourtia de Mons", Cenomanian; 1 specimen (IST-9127, figured by SMISER (1935), pl. 3, fig. 5a-d).
- DIMENSIONS
 D = 8.2 mm; h = 4.9 mm; dp = 1.8 mm.
 h/D = 0.59; dp/D = 0.33.

DESCRIPTION

Small *Discoidea*, with hemispherical adapical side; the adoral side is slightly concave, with a sunken, funnel-shaped peristome.

The peristome is small and circular, situated in the centre of the adoral side. The periproct is elliptic, its long axis having a radial orientation. It is inframarginal, situated halfway between the peristome and the margin of the adoral side.

Ambulacra correspond to arcs of 20° . Poriferous zones are simple, straight and not sunken throughout. Pores are circular, forming oblique pore-pairs, with very narrow interporous partitions. Ambulacral tubercles are arranged in four vertical series. Adradial series are well developed and regular, with a small, perforate and crenulate tubercle for every three pore-pairs. The ambitus is convex throughout. The ambitus is convex throughout, with the radius of curvature in the perradial parts of the ambulacra slightly greater than the mean radius of the ambital test. Thus the adradial series of tubercles are positioned on low ridges, running from the apical system to the peristome. Perradial series of tubercles are irregular and less well developed. They disappear in the narrower parts of the ambulacra, close to the apex and in the vicinity of the peristome. The remaining space on the ambulacra is completely covered by a dense and fine granulation.

Interambulacra correspond to arcs of 52° . Every interambulacral plate carries five tubercles, perforation and crenulation of which are very difficult to observe on specimen KBIN IST-9127. Let us number these tubercles from 1 to 5, starting at the adradial suture. We can now state that tubercle nr. 1 lies close to the adoral suture. Tubercle nr. 2 is situated in the vicinity of the adapical suture. Tubercles 3, 4 and 5 lie on the longitudinal (horizontal) axis of the plate. Tubercle 3 is larger than the others. All tubercles are arranged in more or less regular, vertical series. Only the third series extends completely up from the peristome to the apical system. Interradial parts of the interambulacra, with tubercles 4 and 5, are less strongly curved (larger radius of curvature) than those parts bearing tubercle 3. Because of this feature, the third series of tubercles is situated on top of a weak, but distinct meridional ridge. Scrobicules are very small and surrounded by tiny scrobicular tubercles, which cannot be distinguished from extrascrobicular granules. Extrascrobicular surfaces are completely covered by a very dense, very fine granulation.

DISCUSSION

Relatively few species of *Discoidea* have been described from the Cenomanian and the Turonian of Western Europe. *D. subuculus* has been noticed in pre-Linnean times and has been redescribed from the Cenomanian of Germany, e.g. by LESKE (1778), GMELIN (1788), GOLDFUSS (1826) e.a. Early in the 19th century, LAMARCK (1816) introduced the name *Galerites rotularis* for specimens from the Cretaceous of France, which he recognised to be synonymous with Leske's species. Understandably, LAMARCK's name soon became obsolete and has not been used again, since 1836.

D. minima was described by AGASSIZ (1840) from unspecified Cretaceous strata in France. The species was thoroughly redescribed by COTTEAU (1861), who pointed out some differences with *D. subuculus*. AGASSIZ's species should be smaller than mean *D. subuculus* (a); its h/D-ratio should be higher (b); its adoral side should be more angular in outline (c); its peristome should not be sunken (d). As a matter of fact, at least one of these points of difference is related with smaller size (d); others (b, c) cannot be confirmed, not even on COTTEAU's own figures. The great similarity between *D. subuculus* and *D. minima* has already been noticed by FORBES (1850) and by DESOR (1857), who considered them to be synonymous. In my opinion, *D. minima* is no more than young and/or small specimens of *D. subuculus*.

An exceptionally well preserved single specimen of unknown provenance, induced DESOR (1842) to create the name *Discoidea pisum*, for what he believed to be a new species. The specimen shows a few characteristics which can only rarely be observed on small *Discoidea*. Yet, the differences between *D. pisum* and *D. subuculus* are so small and subtle, that I believe the former to be a junior synonym of the latter. Since BRONN (1849), the name *D. pisum* has not been used again in literature.

D. arizensis has been described by COTTEAU (1887) from the Cenomanian of the dept. Ariège, in the French Pyrenees. The specimens studied by COTTEAU are very similar to *D. subuculus*, being however unusually large. Other differences, such as the presence of more numerous interambulacral tubercles and a sunken peristome, are associated with larger size and/or higher age: they probably have little significance of their own. In my opinion, *D. arizensis* is a junior synonym of *D. subuculus*, based on a few exceptionally large specimens. The name has been used for the last time by LAMBERT (1911).

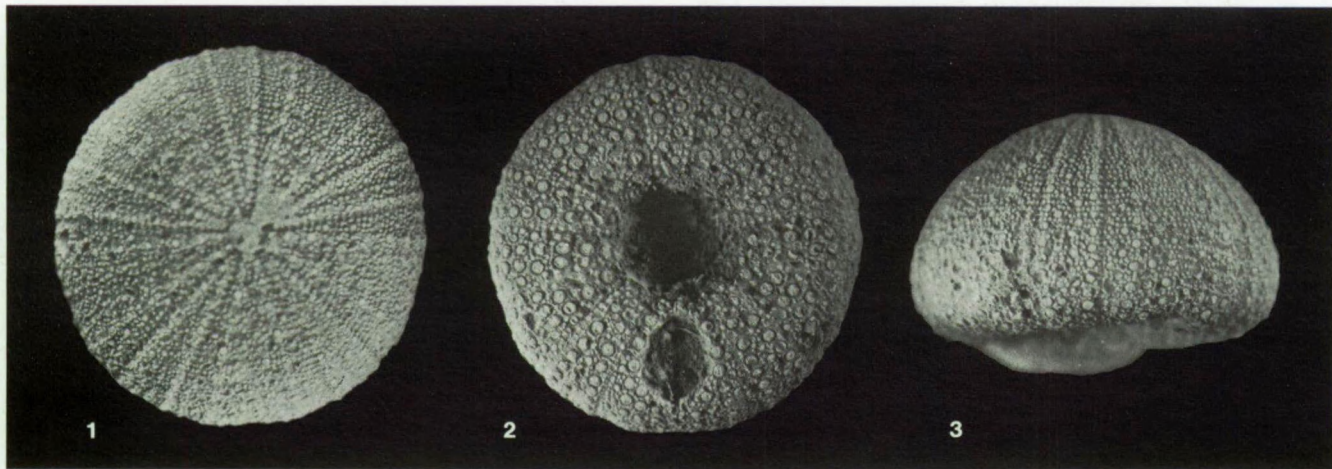


Fig. 1 — *Discoidea subuculus* (LESKE, 1778); Mons Tourtia, Cenomanian: Sassegnies, dept. Nord, France; x 6; KBIN-collection IST-9127. 1, adapical view; 2, adoral view; 3, lateral view.

Differences between *D. subuculus*, *D. inferus* (DESOR, 1847) and *D. favrinus* (DESOR, 1842) have recently been thoroughly discussed and well illustrated by SMITH & PAUL (1985) and by SMITH, PAUL, GALE & DONOVAN (1988). I agree with their points of view, having little to add to their excellent work.

Three species of *Discoides* are known from the Tethyan Cenomanian: *D. jullieni* PERON & GAUTHIER, (in COTTEAU, PERON & GAUTHIER, 1879), from Algeria, *D. dendroides* BLANCKENHORN, 1925, from the Levant, *D. dubertreti* KELLER & VAUTRIN, 1937 and *D. forgemolli* COQUAND, 1864, from Algeria.

D. jullieni differs from *D. subuculus* in having five instead of four genital pores. According to the figures, published by COTTEAU, PERON & GAUTHIER, 1879 and by COTTEAU, 1861, the extrascrobicular granulation is much coarser in *D. subuculus* than in *D. jullieni*. The arrangement of tubercles is similar in both species. It must be stressed that only the holotype of *D. jullieni* is known. Therefore, I wonder if the subtle differences between the species and *D. subuculus* should not rather be attributed to intraspecific variability. Yet, not having been able to examine *D. jullieni* more closely, the question of its possible synonymy with *D. subuculus* must remain open.

D. forgemolli (COQUAND, 1862) is very similar to *D. subuculus*. The most striking difference is again the presence of five genital pores in *D. forgemolli*. Moreover, *D. forgemolli* is considerably larger than *D. subuculus*. If it were not for the presence of a supplementary genital pore, I would not hesitate to consider *D. forgemolli* to be a junior synonym of *D. subuculus*. As long as the taxonomic significance of this feature is unclear, I reserve my opinion.

Species such as "*Discoides*" *cylindricus* (AGASSIZ, 1840) and "*Discoides*" *dixoni* FORBES, 1850 are sufficiently different from *D. subuculus* to be classified in other genera, respectively *Camerogalerus* and *Dixonia*. The differences with true *Discoides* have been clarified by WAGNER & WYATT DURHAM (1966).

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